HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Jimmycomelately Creek Summer Chum Salmon Supplementation
Species or Hatchery Stock:	Summer chum salmon, *Oncorhynchus keta*, Jimmycomelately Creek stock
Agency/Operator:	Washington Department of Fish and Wildlife / Wild Olympic Salmon
Watershed and Region:	Jimmycomelately Creek, Sequim Bay, Strait of Juan de Fuca, Washington State
Date Submitted:	February 28, 2000
Date Last Updated:	March 26, 2001

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program. Jimmycomelately Creek summer chum salmon supplementation

1.2) Species and population (or stock) under propagation, and ESA status.
Summer chum salmon, *Oncorhynchus keta*, Jimmycomelately Creek stock;
Hood Canal/Strait of Juan de Fuca Summer Chum ESU: Threatened

1.3) Responsible organization and individuals

Agency lead contact:

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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program: some funding and Labor and Industries insurance for volunteers provided through Regional Fish Enhancement Group North Olympic Salmon Coalition (NOSC) and Wild Olympic Salmon (WOS); Point No Point Treaty Council and tribes

1.4) Funding source, staffing level, and annual hatchery program operational costs.
Source: WDFW, NOSC, WOS.
Staffing: oversight and support provided by WDFW fish biologist, habitat biologist, fish health specialist, and Dungeness Hatchery Complex personnel; hatchery operations staffed by trained volunteers with NOSC and Wild Olympic Salmon
Operational costs: ~ $62,000

1.5) Location(s) of hatchery and associated facilities.

Broodstock collection: at trap on Jimmycomelately Creek (WRIA 17.0285) at RM 0.1.
Hurd Creek Hatchery: located on Hurd Creek (WRIA 18.0028, a tributary to Dungeness River (WRIA 18.0018) at RM 10.6; eggs and milt transported to Hurd Creek Hatchery for fertilization, initial incubation and/or rearing, and otolith marking; eyed eggs and/or fry transported to Jimmycomelately Creek facility.
Jimmycomelately Creek facility: located at RM 1 on Jimmycomelately Creek (WRIA 17.0285), tributary to Sequim Bay, Strait of Juan de Fuca; egg incubation, hatching, and/or rearing.

1.6) Type of program.

Integrated Recovery

1.7) Purpose (Goal) of program.

Restoration. The goal of this program is to contribute to the restoration of a healthy, natural, self-sustaining population of summer chum salmon that will maintain the genetic characteristic of the native stock.

1.8) Justification for the program.

Jimmycomelately Creek summer chum salmon was identified as a stock at "high risk" and selected as a supplementation project in the Summer Chum Salmon Conservation Initiative (SCSCI) developed by Washingtonton Department of Fish and Wildlife and Point-No-Point Treaty Tribes (2000). This program is fully consistent with the rationale, intent, and implementation of the supplementation approach identified in the SCSCI. The following is taken from the SCSCI:

> Supplementation is viewed as an effective tool, in combination with other management actions, for restoring natural production to healthy levels within the Hood Canal/Strait of Juan de Fuca summer chum ESU. By the early 1990s, summer chum populations had declined to such low levels that the risk of extinction to portions of the ESU on the short term was high. Furthermore, with the recent extirpation of four populations, the need for hatchery-based actions was identified to reintroduce summer chum into vacant habitat that, based on stock assessment data, appeared unlikely to be colonized naturally within a reasonable time frame. The need to quickly boost the population sizes above critically low levels, and the fact that some factors limiting production, such as harvest and habitat degradation, were in the process of being addressed also contributed to the decision to use supplementation.
>
> The intent of supplementation efforts within this ESU is to reduce the short term extinction risk to existing wild populations and to increase the likelihood of their

recovery to a healthy status. These objectives can be accomplished through the establishment of supplemented populations using indigenous brood stock, and through reintroduction of appropriate populations into streams now lacking summer chum. In keeping with the intended ephemeral nature of this form of artificial production, the proposed supplementation strategy will be limited in duration and designed to help maintain the populations while potential factors for decline are identified and being addressed. Monitoring and evaluation activities proposed for the programs will provide important new scientific information regarding the effectiveness of supplementation as it relates to chum salmon. Contribution to the re-establishment of naturally functioning ecosystems through the recovery or restoration of summer chum populations, is also an intent.

The supplementation focus at this time is on recovery of "at risk" stocks and reintroduction of extirpated populations. This current emphasis is in response to the generally poor condition of the stocks within the ESU. For "at risk" populations chosen through this program for supplementation, hatchery production of fed fry of large size relative to natural fry, released at the proper migration time, will provide a survival advantage that will improve the status of the populations more rapidly than is possible through natural production alone. The immediate objective for these populations will be to boost the population abundance as quickly as possible, increasing natural spawner densities to sustainable levels that will alleviate the risk of extinction to the populations. For selected, extirpated populations, seeding of usable habitats will be accomplished through reintroduction strategies developed specifically for each recipient watershed. Reintroduction planning strategies will include selection of the most appropriate donor stock, acclimation to the recipient location, and release of fed chum fry to maximize the likelihood for the establishment of a population.

1.9) List of program "Performance Standards".

The following are objectives for using supplementation in the recovery of the Jimmycomelately (JCL) summer chum stock as presented in the SCSCI (WDFW et al. 2000):

1) initiate a supplementation program using the indigenous JCL summer chum broodstock, thus retaining future options for recovery of the JCL population;

2) boost the numbers of naturally produced fish in JCL Creek using the indigenous population as the donor; develop and maintain, for 12 years, a population comprised of supplemented and naturally spawning fish using hatchery and wild-origin broodstock;

3) monitor and evaluate, and annually report the effectiveness of the supplementation program, as measured by consistency with criteria set forth in the SCSCI (WDFW et al. 2000).

1.10) List of program "Performance Indicators", designated by "benefits" and "risks."

This program is fully consistent with the intent and implementation of the monitoring and evaluation component for supplementation programs identified in the SCSCI. The monitoring and evaluation program in the SCSCI responds to concerns regarding the uncertainty of summer chum supplementation and reintroduction effects by addressing the following four elements :

1. The estimated contribution of supplementation/reintroduction program-origin chum to the natural population during the recovery process;

2. Changes in the genetic, phenotypic, or ecological characteristics of populations (target and non-target) affected by the supplementation/reintroduction program;

3. The need and methods for improvement of supplementation/reintroduction activities in order to meet program objectives, or the need to discontinue a program because of failure to meet objectives; and

4. Determination of when supplementation has succeeded and is no longer necessary for recovery.

1.10.1) "Performance Indicators" addressing benefits.

Element 1: Estimate the contribution of supplementation/reintroduction program-origin chum to the natural population during the recovery process.

1. Differentially mark all hatchery-origin summer chum fry to allow for distinction from natural-origin fish upon return as adults on the spawning grounds. This will be accomplished by otolith (thermal) marking or another permanent, effective method.

2. Conduct spawning ground surveys throughout the summer chum return to enumerate spawners, and to collect information regarding fish origin (via random sampling of fish heads for otoliths), and age class composition through scale sampling.

3. Estimate the number of naturally spawning hatchery-origin summer chum contributing to each supplemented population's annual escapement.

Element 4: Collect and evaluate information on adult returns.

1. Commencing with the first year of returns of progeny from naturally-spawned, hatchery-origin summer chum, evaluate results of spawning ground surveys and age class data collections to:

a. Estimate the abundance and trends in abundance of spawners;
b. Estimate the proportion of the escapement comprised by chum of hatchery lineage, and of wild lineage;
c. Through mark sampling, estimate brood year contribution for hatchery lineage and wild-origin fish.

Using the above information, determine whether the population has declined, remained stable, or has been recovered to sustainable levels. The ability to estimate hatchery and wild proportions will be determined by implementation plans, budgets, and assessment priorities.

1.10.2) "Performance Indicators" addressing risks.

Element 1: Estimate the contribution of supplementation/reintroduction program-origin chum to the natural population during the recovery process.

1. Monitor escapements of non-supplemented populations to determine the level of straying of supplementation program-origin fish to other drainages.

Element 2: Monitor and evaluate any changes in the genetic, phenotypic, or ecological characteristics of the populations presently affected by the supplementation program.

1. Collect additional GSI data (allozyme or DNA-based) from regional summer chum adult populations to determine the degree to which discrete populations exist in the individual watersheds.
2. Continue GSI allozyme collections of summer chum spawners throughout the region for comparison with past collections to monitor changes in allelic characteristics, and with the intent to assess whether the supplementation program has negatively affected the genetic diversity of natural populations.
3. Continue collecting and archiving DNA samples for future analysis.

Element 3: Determine the need, and methods, for improvement of supplementation or reintroduction operations or, if warranted, the need to discontinue the program.

1. Determine the pre-spawning and green egg to released fry survivals for each program at various life stages.

a. Monitor growth and feed conversion for summer chum fry.
b. Determine green egg to eyed egg, eyed egg to swim-up fry, and swim-up fry to released fry survival rates for summer chum.
c. Maintain and compile records of cultural techniques used for each life stage, such as: collection and handling procedures, and trap holding durations, for chum broodstock; fish and egg condition at time of spawning; fertilization procedures, incubation methods/densities, temperature unit records by developmental stage, shocking methods, and fungus treatment methods for eggs; ponding methods, start feeding methods, rearing/pond loading densities, feeding schedules and rates for juveniles; and release methods for fed fry.
d. Summarize results of tasks for presentation in annual reports.
e. Identify where the supplementation program is falling short of objectives, and make recommendations for improved fry production as needed.

2. Determine if broodstock procurement methods are collecting the required number of adults that represent the demographics of the donor population with minimal injuries and stress to the fish.

a. Monitor operation of adult trapping operations, ensuring compliance with established broodstock collection protocols for each station.
b. Monitor timing, duration, composition, and magnitude of each run at each adult collection site.
c. Maintain daily records of trap operation and maintenance (e.g. time of collection), number and condition of fish trapped, and environmental conditions (e.g. river stage, tide, water temperature).
d. Collect biological information on collection-related mortalities. Determine causes of mortality, and use carcasses for stock profile sampling, if possible.
e. Summarize results for presentation in annual reports. Provide recommendations on means to improve broodstock collection, and refine protocols if needed for application in subsequent seasons.

3. Monitor fish health, specifically as related to cultural practices that can be adapted to prevent fish health problems. Professional fish health specialists supplied by WDFW (or USFWS for federal agency operations) will monitor fish health.

a. Fish health monitoring will be conducted by a fish health specialist. Significant fish mortality to unknown causes will be sampled for histopathological study.
b. The incidence of viral pathogens in summer chum broodstock will be determined by sampling fish at spawning in accordance with procedures set forth in the "Co-Managers of Washington Fish Health Policy (WDFW and WWTIT 1998).
c. Recommendations on fish cultural practices will be provided on a monthly basis, based upon the fish health condition of chum fry.
d. Fish health monitoring results will be summarized in an annual report.

Element 4: Collect and evaluate information on adult returns.

This element will be addressed through consideration of the results of previous "Elements 1., 2., and 3.", and through the collection of information required under adaptive criteria that will be used as the basis for determining when to stop a supplementation or reintroduction program.

1. Collect age, sex, length, average egg size, and fecundity data from a representative sample of broodstock used in each supplementation program for use as baseline data to document any phenotypic changes in the populations.

2. Compare newly acquired electrophoretic analysis data reporting allele frequency variation of returning hatchery and wild fish with baseline genetic data. Determine if there is evidence of a loss in genetic variation (not expected from random drift) that may have resulted from the supplementation program..

1.11) Expected size of program.

1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

97 adults (39 females and 58 males).

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry	Jimmycomelately Creek	86,000
Fingerling		
Yearling		

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

None available, 1999 is first year of program

1.13) Date program started (years in operation), or is expected to start.

Initiated with brood year 1999

1.14) Expected duration of program.

This program is fully consistent with the standards presented in the SCSCI. Expected maximum duration is three generations (12 years); 12 years remaining

1.15) Watersheds targeted by program.

Jimmycomelately Creek (WRIA 17.0285)

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

Alternative actions considered and implemented include integration with habitat and harvest recovery measures identified in the SCSCI.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

2.1) List all ESA permits or authorizations in hand for the hatchery program.
None in hand; ESA listings are new in this area.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

The following is paraphrased from life history information for Hood Canal and Strait of Juan de Fuca summer chum presented in the Summer Chum Salmon Conservation Initiative (WDFW et al. 2000):

Hood Canal and Strait of Juan de Fuca summer chum populations are one of three genetically distinct lineages of chum salmon in the Pacific Northwest region; and were designated as an evolutionarily significant unit (ESU) based upon distinctive life history and genetic traits. The uniqueness of the summer chum life history is best characterized by their late summer entry into freshwater spawning areas, and their late winter/early spring arrival in the estuaries as seaward-migrating juveniles. Reproductive isolation has been afforded by a significantly different migration and escapement timing and geographic separation from other chum stocks.

Summer chum spawning occurs from late August through late October. Eggs eye in redds after about 4 to 6 weeks incubation and hatch about 8 weeks after spawning. Fry emerge from redds, usually with darkness, between February and late May and immediately commence migration downstream to estuarine areas. Summer chum fry initially inhabit nearshore areas and occupy sublittoral seagrass beds for about one week and are thought to be concentrated in the top few meters of the water column both day and night. Upon reaching a size of 45-50 mm, fry move to deeper offshore areas. Migrating at a rate of 7-14 km per day, the southernmost outmigrating summer chum fry population in Hood Canal would exit the Canal 14 days after entering seawater (90% of population exits by April 28 each year, on average); and Strait of Juan de Fuca summer chum would exit the Discovery Bay area 13 days after entering seawater (90% completion by June 8 each year, on average).

Summer chum mature primarily at 3 and 4 years of age. The southerly ocean migration down the Pacific Northwest coast from rearing areas in the northeast Pacific Ocean likely commences in mid-July and continues through at least early September. Adults enter terminal areas from early August through late September, with spawning ground entry timing in Hood Canal from late August

through mid-October and in Strait of Juan de Fuca from early September through mid-October. Hood Canal and Strait of Juan de Fuca summer chum typically spawn soon after entering freshwater in the lowest reaches of natal streams. Low summer-time flows likely have acted to confine summer chum spawning in this region to the lowest reaches.

- Identify the ESA-listed population(s) that will be directly affected by the program.
The program will lead to recovery of Jimmycomelately Creek summer chum salmon, a stock identified as part of the Hood Canal/Strait of Juan de Fuca Summer Chum ESU.

- Identify the ESA-listed population(s) that may be incidentally affected by the program.
The program may incidentally affect chinook salmon in the Puget Sound Chinook ESU (by providing additional prey base for chinook). It is not anticipated that the program will impact bull trout since none are known to be present in the area of the program.

2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds.

The Jimmycomelately Creek summer chum population was designated as depressed through the 1992 WDFW-Tribal Salmon and Steelhead Stock Inventory process (WDF et al. 1993). In the SCSCI (WDFW et al. 2000), the Jimmycomelately Creek summer chum stock is identified as "critical" due to chronically low escapements. In addition, a risk assessment using procedures for measuring extinction risk as presented by Allendorf et al. (1997) was done and the current risk of extinction was judged to be high. As a supplementation effort, use of the natural broodstock through the program will intentionally increase the number of returning summer chum, assisting in the recovery of the population.

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

Data are not presently available for the natural population, but will be collected.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.
Source is SCSCI (for 1987 through 1998) and WDFW files (for 1999 and 2000):

	Jimmycomelately Creek
1987	464
1988	1,052
1989	173
1990	63
1991	125
1992	616
1993	110
1994	15
1995	223
1996	30
1997	61
1998	98
1999	7
2000	55

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.
None available

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take.

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Listed summer chum salmon adults will be trapped and collected for broodstock from August through October and result in a take. The trap is located on private property immediately adjacent to a residence. Human disturbance or poaching of summer chum held in the trap have not been experienced during the duration of operation and are minimized by holding the adults in PVC tubes inside the trap. Chinook salmon are not indigenous to Jimmycomelately Creek and takes of listed chinook are not anticipated through the broodstock collection program. Any straying chinook salmon encountered in the trap will be passed by hand upstream daily, above the weir, with minimal delay.

Incubation and rearing of summer chum from September through April has a high potential to take listed summer chum due to natural mortality causes and due to fish culture activities and conditions which affect fish health and development including handling procedures, fertilization procedures, water temperature, water quality, water flow, feeding success, and transport and/or transition from fresh to saltwater environments. Risk aversion measures minimize the likelihood for the take of listed summer chum (see 5.8). No take of other listed salmonids due to these activities is anticipated.

Physical harm of reared summer chum at release (March through May) due to descaling or increased susceptibility to predation at release has a potential to take listed summer chum, but has been minimal in other summer chum salmon supplementation programs. No take of other listed salmonids is anticipated.

The contact with summer chum during spawner escapement surveys (August through October), carcass recovery programs (September and October), and other monitoring and evaluation programs has a potential to take listed summer chum, but care is taken not to harm, harass or otherwise disturb summer chum spawners.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

The supplementation program was initiated on Jimmycomelately Creek in 1999 and 6 summer chum adults were trapped and collected for broodstock. Mortality during the incubation and rearing stages was an estimated 2,377 eggs or fish; survivals were 66% green egg-to-release and 93.9% eyed egg-to-release.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

Projected annual take levels are (1) 12,900 eggs or fry mortality during incubation, rearing, and release (based on 98,900 eggs, 85% survival egg to release, and 86,000 fry release); (2) 97 adults removed for broodstock (based on 98,900 eggs, 2500 eggs/female, 1.5 males/female); (3) unintentional lethal take of 2 adults during trapping, holding prior to spawning or release (based on 2% loss of 100 adults trapped); (4) 33 adults associated with disturbance of spawners during spawner surveys and carcass and mark recovery projects (based on multiple events and average of 1 occurrence/spawner for one-third of 100 spawners; (5) 300 carcasses sampled for otoliths, scales, Genetic Stock Identification, and other biological information during spawner surveys, broodstocking, and routine monitoring and evaluation activities (based on target sample size of 300). See Table 1.

As the return of summer chum adults increases, it is anticipated that there will be additional takes, but these can not be quantified at this time. It is anticipated there will be (1) a take of adults associated with the broodstock trapping operation where fish are captured, handled and released upstream and (2) a take of adults associated with disturbance of spawners during spawner surveys and carcass and mark recovery projects.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

The take will be limited since the number of broodstock collected will be consistent with guidelines and protocols in the SCSCI and the number of carcasses collected will be consistent with monitoring and evaluation objectives in the SCSCI. Methods to prevent catastrophic loss during incubation, rearing, and release are in compliance with program operations and protocols in the SCSCI (which includes measures to cull surplus production) and will limit take.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.
This program is fully consistent with the guidelines, protocols, and implementation of the co-manager's Summer Chum Salmon Conservation Initiative (SCSCI) (WDFW et al. 2000).

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

This HGMP is consistent with relevant standing orders and agreements. The Puget Sound Salmon Management Plan (PSSMP) is a federal court order that currently controls both the harvest management rules and production schedules for salmon in Hood Canal under the *U.S. v. Washington* management framework. The parties to the SCSCI recognize that it may be necessary to modify these plans in order to implement the recommendations that will result from the SCSCI. However, the provisions of the PSSMP will remain in effect until modified through court order by mutual agreement

3.3) Relationship to harvest objectives.

The summer chum supplementation program is integrated with fisheries management measures as defined in the Summer Chum Salmon Conservation Initiative (WDFW et al. 2000). The "base conservation" fishery total harvest rate proposed under the Summer Chum Salmon Conservation Initiative is 10.8% (with a range of 3.3% to 15.3%). These rates reflect incidental fishery harvest levels in Canadian and U.S. fisheries. Actual harvest rates on summer chum produced in eastern Strait of Juan de Fuca watersheds should be lower, due to the lack of terminal area commercial fisheries directed at other species where summer chum may be incidentally taken.

3.3.1) Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

No directed fisheries on summer chum salmon result from adult fish produced through the Jimmycomelately Creek programs. As noted in 3.3, above, the "base conservation" fishery total harvest rate proposed under the Summer Chum Salmon Conservation Initiative is 10.8% (with a range of 3.3% to 15.3%), but should be lower for the Jimmycomelately Creek stock. These rates reflect incidental fishery harvest levels in Canadian and U.S. fisheries. Exploitation rates on the Jimmycomelately stock have been 8.7%, 10.6%, 51.2%, 35.5%, 27.2%, 23.2%, 11.0%, 16.8%, 4.8%, 2.0%, 2.4%, and 2.6% for the years 1987 through 1998, respectively (WDFW et al. 2000).

3.4) Relationship to habitat protection and recovery strategies.

The summer chum supplementation program is integrated with habitat restoration and management measures as defined in the Summer Chum Salmon Conservation Initiative (WDFW et al. 2000). The SCSCI provides a standardized approach to determine freshwater and estuarine limiting factors in each summer chum watershed. Habitat factors for decline and recovery for each watershed are described. In addition, at the ESU scale, protection and restoration strategies for each limiting factor for decline are provided. The goal of the habitat protections and restoration strategy is to maintain and recover the full array of watershed and estuarine-nearshore processes critical to the survival of summer chum across all life stages.

3.5) Ecological interactions.

Chum salmon have an unique relationship with other salmonid species that will generally benefit the other species. In most circumstances, because of their small size and relative abundance at out-migration, summer chum fry have a positive impact as prey for other salmonids, including chinook salmon, coho salmon, and

coastal cutthroat trout. In turn, chinook and coho salmon and coastal cutthroat could negatively impact the summer chum supplementation program via predation on summer chum fry, but the risk of significant impact is likely low. Chum have not been identified as predators on other salmonids and have a low risk of negatively impacting salmonids as predators.

The supplementation program will result in an increase in the number of chum salmon carcasses in freshwater areas and provide a source of nutrients which will benefit other salmonids and non-salmonids.

Supplemented summer chum may compete for food with wild chum fry. This risk will be minimized through the release of supplemented fish at a larger size than the wild fry which should lead to niche separation in the two groups.

SECTION 4. WATER SOURCE

4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Summer chum adults are trapped and held in JCL Creek for spawning, no water is removed from the creek for broodstock collection and holding purposes. Unfertilized gametes are transferred to WDFW's Hurd Creek Hatchery for fertilization, incubation and/or initial rearing. The hatchery, located 4 miles north of Sequim, Washington, is supplied with well water and water withdrawn form Hurd Creek, a tributary to the Dungeness River. The hatchery is permitted for the withdrawal of 6.4 cfs of water from these sources. Fed fry will be returned to circular rearing tanks that are gravity fed by springs tributary to JCL Creek at approximately RM 1 for continued rearing and acclimation. The spring fed stream flows range from 40 to 60 gpm during the period of operation (November - May). Up to 40 gpm are withdrawn via a gravity flow system using two 2 inch PVC lines with separate collection systems. The water has over 100% oxygen saturation, measuring 13ppm. Water used for rearing at Hurd Creek and JCL Creek is returned to the creeks near the point of withdrawal. The source stream combines three spring sources and is located within forested land. The remoteness of the location provides additional security from potential vandalism of the water supply.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

Hurd Creek Hatchery and Jimmycomelately Creek facility withdrawal methods (wells, screened intakes) will not lead to injury or mortality to listed fish because the intake structures are located above natural barriers to fish migration (Jimmycomelately Creek) or are supplied by infiltration and are adequately screened to minimize risk to listed fish (Hurd Creek). The Hurd Creek Hatchery operates under a standing NPDES permit that limits discharge effects on the environment, and requires monitoring of effluent for settleable and suspended solids. The Jimmycomelately Creek facility produce a relatively small amount of fish each year, and well under the 20,000 pounds per year criteria set by WDOE as the limit for concern regarding hatchery effluent discharge effects and for the requirement for an NPDES permit. The NPDES permit and low production levels will likely lead to no adverse effects on water quality from the program on listed fish.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Broodstock are collected for the program using a temporary weir and trap box positioned in Jimmycomelately Creek at approximately RM 0.1. The weir is constructed of metal posts and wood slat panels. Fish are directed into the 6' by 10' tubular steel trap box and trap area through a "V" weir; the trap area has a natural gravel bottom. Captured fish are held in fish tubes constructed of perforated PVC pipe within the trap box until their daily removal for spawning or passage upstream. Fish are spawned directly adjacent to the trap. Spawning is accomplished as needed beneath a temporary awning to protect the eggs and milt collected from the fish from rain. Eggs and milt are transported chilled in plastic bags and ice chests by truck to Hurd Creek Hatchery for fertilization and loading into iso-bucket incubators.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).
Eggs and milt are chilled and transported in plastic bags by truck from JCL Creek to Hurd Creek Hatchery. Fry are transported to the remote site on JCL Creek by truck in a 4' x 4' x 2.5' plastic fish tote aerated with regulated oxygen from an oxygen bottle via an air stone. Covered five gallon buckets are used to transport fry from the tote down a trail to the rearing tanks, a journey lasting approximately five minutes. The fry are transported in the same manner from the remote site to the estuary where they are released.

5.3) Broodstock holding and spawning facilities.

Broodstock are held in the broodstock collection trap described in 5.1, above, for 1 - 4 days prior to scheduled spawning days (usually twice a week). The broodstock collection trap is checked two or more times a day. Fish may be held in the tubes for longer periods as needed for the fish to ripen. Fish are spawned directly adjacent to the trap. Spawning is accomplished as needed beneath a temporary awning to protect the eggs and milt collected from the fish from rain.

5.4) Incubation facilities.

Green eggs are incubated in iso-buckets and eyed eggs are incubated in Heath stack incubators at Hurd Creek Hatchery. All eyed eggs currently remain at Hurd Creek Hatchery, but as the return of summer chum adults increases, remote site incubators (RSIs) will be used on JCL Creek. Each 55 gallon RSI will be loaded at low densities (8,000 eggs per RSI screen, up to 50,000 eggs per RSI) and supplied with 8-12 gpm inflow for incubation through swim-up.

5.5) Rearing facilities.

Swim-up fry at Hurd Creek are initially reared in 4' circular fiberglass drain tanks 2' deep. The fry are later transferred via truck to the remote rearing site on JCL Creek where similar rearing tanks are set up. The fish will be divided into two or more rearing tanks at JCL Creek. The rearing tanks are covered with lids made of heavy wire mesh on one side and plywood on the other. The lids are reinforced and locked to avert predation and/or harassment. As RSIs are used to incubate eggs at JCL Creek, fry will be allowed to volitionally migrate upon swim-up from the RSIs into rearing vessels.

5.6) Acclimation/release facilities.

At the appropriate release date, and upon reaching the desired fish release size, chum reared at the facility are bucketed into a 4' x 4' x 2.5' plastic tote filled with freshwater. The fish are trucked to a location in lower JCL Creek, transferred into buckets and hand-carried for release upstream of the estuary area near the creek mouth.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

1999 is the first year of operation. No difficulties or disasters have occurred.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

The head-box structure used to withdraw water from Hurd Creek is screened in compliance with NMFS screening criteria, and adverse effects on any listed fish species present in the creek are minimal. The hatchery is staffed full-time to allow for rapid response to catastrophic events including flooding or power failure. A low flow alarm system and back-up generator also allow for appropriate response to water or power failures to safeguard rearing fish.

Water required for rearing at the remote salmon rearing site at JCL Creek is supplied by gravity flow from a spring-fed stream. Incubating and rearing eggs and fry will therefore not be affected by power failures. Combined intake systems can supply as much as 60gpm, although the operation requires less than 20gpm. Parallel intakes function as back-up water supply for this operation. Separate collections systems are contained within two check dams. The dams are placed approximately 10 feet apart and are at elevation differences of approximately 1 foot. Check dams contain a water intake box screened with 10"x 18" isobar material that has 0.030mm-0.040mm spacing. The iso-bar material has a suction action to capture water, and a self-cleaning function to draw debris off. A 2-inch PVC pipe enters each intake box carrying the water 40 to 60 feet to one 55 gallon clarifier/regulator barrel where water flow from both lines is collected and distributed to the incubation units and/or rearing vessels. The only valves operative in the system are on the outflow from the 55 gallon clarifier/regulator barrel controlling flow to the incubation units and/or rearing vessels. Excess flow is managed by 2-inch diameter line exiting the top of the barrel above the outflow lines to the incubation/rearing vessels. The JCL Creek site is not staffed full time, but is checked at least twice daily during operation and more often during high flows and severe cold weather events. The remoteness of the location provides additional security from potential vandalism of the water supply.

Due to their small size, no listed fish use the JCL springs for spawning and rearing. Water removed from the springs for fish rearing is returned to JCL Creek near the point of withdrawal. Hurd Creek Hatchery has been issued an NPDES permit authorizing the release of effluent from the hatchery, in compliance with permit limits. No effluent discharge permits are required for the JCL summer chum rearing program due to its small size (presently less than 50 pounds of fish production per year). No adverse effects to listed fish populations are expected as a result of effluent discharge from the Hurd Creek and JCL Creek operations.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1) Source.

Indigenous summer chum broodstock were first collected from Jimmycomelately Creek for the supplementation program in 1999.

6.2) Supporting information.

6.2.1) History.

The founding Jimmycomelately Creek summer chum stock was designated as "critical" in status and at high risk of extinction by the Co-managers in the SCSCI (WDFW et al. 2000). As a supplementation effort, the program is designed to increase the numbers of summer chum returning to Jimmycomelately Creek, resulting in recovery of the population.

6.2.2) Annual size.

The number of broodstock collected is consistent with the guidelines in the SCSCI. As an emergency measure, and as specified for extremely small populations that are identified as at immediate risk of extinction in the SCSCI, the supplementation program will be allowed to collect 100 % of the returning population for artificial propagation. This emergency measure will be continued until the population rebounds to annual return levels greater than 100 spawners (WDFW et al. 2000).

6.2.3) Past and proposed level of natural fish in broodstock.

Only summer chum indigenous to the Jimmycomelately Creek stock will be used as broodstock

6.2.4) Genetic or ecological differences.

The indigenous Jimmycomelately Creek stock is the only source of broodstock. Hence, there are no known genotypic, phenotypic, or behavioral differences between the current supplementation stock and the natural stock, but it is being monitored.

6.2.5) Reasons for choosing.

It is the indigenous summer chum salmon stock. No special traits or characteristics were selected for in the broodstock within the indigenous stock

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

The risk of among population genetic diversity loss will be reduced by selecting the indigenous summer chum salmon population for use as broodstock in the supplementation program. The retention of 100% of the summer chum trapped for use as broodstock reduces the likelihood of adverse genetic effects to the population that may result from non-random selection (either intentional or unintentional) of fish for artificial propagation.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adults

7.2) Collection or sampling design.

Summer chum broodstock are collected at RM 0.1 in JCL creek between August 15 and October 15, which represents the entire period when natural spawning occurs. A temporary weir and trap box are used to capture and hold adult fish for spawning. The lower river location of the trapping operation allows for access to virtually the entire summer chum return, helping to ensure that broodstock collected represent the total returning natural population. The retention of 100% of the summer chum trapped for use as broodstock reduces the likelihood of adverse genetic effects to the population that may result from non-random selection (either intentional or unintentional) of fish for artificial propagation. The weir and trap are checked at least daily by NOSC or WOS volunteers and/or WDFW staff during operation, to ensure that the trap is operating properly and that any fish captured are held in safe condition. Monitoring of the trap is increased during freshets. In the event flooding, the weir panels will be removed, allowing fish to pass safely. This measure prevents injury or mortality to summer chum if the trap were allowed to continue to operate during a flood event. Summer chum held in the locked trap box are further safeguarded from poaching or predation by being held in closed, ventilated PVC tubes and by the presence of an occupied residence immediately adjacent to the trap.

7.3) Identity.

Only one summer chum population is present. Otolith marking of fry and recovery of otoliths from adults will allow identification of hatchery and natural-origin fish.

7.4) Proposed number to be collected:

7.4.1) Program goal:

100% of summer chum adults returning to Jimmycomelately Creek, up to 39 females and 58 males, for a total of 97 adults.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
1988					
1989					
1990					
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998					
1999	4	2			
2000	15	24			

Data source: WDFW files (Link to appended Excel spreadsheet using this structure. Include hyperlink to main database)

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

The production of surplus eggs or fish is avoided to the extent feasible by limiting the number of adult summer chum secured through broodstock collection operations. Summer chum adults trapped in excess of program goals will be passed upstream to spawn naturally. Any surplus production will be treated in accordance with protocols set forth in the Summer Chum Salmon Conservation Initiative (WDFW et al. 2000).

7.6) Fish transportation and holding methods.

None proposed at this time. If Hurd Creek Hatchery is modified so Jimmycomelately Creek summer chum adults can be held in isolation, transportation of adults to Hurd Creek for holding and spawning may be considered in future years.

7.7) Describe fish health maintenance and sanitation procedures applied.

Fish health monitoring associated with adult fish used in the program is conducted through the WDFW Fish Health Division. The incidence of viral pathogens in summer chum broodstock will be determined by sampling fish at spawning in accordance with procedures set forth in the "Co-Managers of Washington Fish Health Policy (WDFW and WWTIT 1998). Ovarian fluid, kidney, and spleen samples are collected from all fish spawned for evaluation by WDFW Fish Health Division staff for disease certification purposes.

7.8) Disposition of carcasses.

Returned to stream for nutrient enhancement.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

The risk of fish disease amplification will be minimized by following Co-manager Fish Health Policy sanitation and fish health maintenance and monitoring guidelines. The indigenous population is the broodstock source. The multi-trait distribution of the broodstock closely matches the multi-trait distribution of the target population (similar spawn timing, size, appearance, age structure, etc.). The broodstock collection is technically and logistically possible.

SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1) Selection method.

As an emergency measure, and as specified for extremely small populations that are identified as at immediate risk of extinction in the SCSCI, the supplementation program will be allowed to collect 100 % of the returning population for artificial propagation. This emergency measure will be continued until the population rebounds to annual return levels greater than 100 spawners. At that time, summer chum broodstock will be collected randomly as the fish arrive at the trap location, proportional to the timing, weekly abundance, and duration of the total return to the creek. The weir and fish trap are located in the lower reaches of the watershed, near the most downstream point of observed natural spawning activity so nearly the entire summer chum annual return to the creek is available to trapping, decreasing the risk that fish trapped through the program are not representative of the total run.

8.2) Males.

Use of backup males will be used when available. Jacks will be used proportional to their abundance in the total return to the creek.

8.3) Fertilization.

Summer chum adults collected at the Jimmycomelately Creek weir are spawned adjacent to the weir site. Eggs and milt collected from spawned fish are placed separately in dry, zip-locked bags, and stored on ice for transport by truck to Hurd Creek Hatchery. Eggs will be fertilized at Hurd Creek Hatchery factorially, or using at least a 1:1 spawning ratio. Spawning protocols are done in accordance with the Co-Managers Fish Health Policy.

8.4) Cryopreserved gametes.

None used.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

100% of adult returning to Jimmycomelately Creek are used as broodstock (see 8.1). A factorial mating scheme or 1:1 individual matings will be applied to reduce the risk of loss of within population genetic diversity for the summer chum salmon population that is the subject of this supplementation program.

SECTION 9. INCUBATION AND REARING -

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Consistent with the SCSCI, the following survival rate objectives for each life stage will be applied to all programs. These rates will be used as criteria for measuring the effectiveness of each program.:

Chum Life Stage	% Survival by Life Stage	Cum. % Survival from Green Egg
Green egg to eye-up	90.0 %	90.0 %
Eye-up to Swim-up	99.5 %	89.5 %
Swim-up to release	95.0 %	85.0 %

Brood year 1999 is the first year of the program:

	Number of eggs or fry					% Survival by life stage		
	Total		Hurd Creek Hatchery/JCL Cr.			Hurd Creek Hatchery/JCL Cr.		
Brood year	Green eggs	Eyed eggs	Eyed eggs	Swim-up fry	Fry released	Green egg to eyed egg	Eyed egg to swim-up	Swim-up to release
1999	6,257	4,130	4,130	3,950	3,880	66.0%	95.6%	98.2%
2000	26,937	27,566	27,566			95.3%		

9.1.2) Cause for, and disposition of surplus egg takes.
None anticipated. Any surplus production will be handled consistent with protocols in the SCSCI.

9.1.3) Loading densities applied during incubation.
After transport from JCL Creek, eggs will be fertilized at Hurd Creek Hatchery factorially, or using at least a 1:1 spawning ratio. After fertilization, the eggs will be water hardened in an iodophore solution as per Co-Manager Fish Health Policy guidelines, then placed in iso-bucket incubators for incubation through the eyed stage. Each iso-bucket incubator will hold the eggs from one female and be supplied with 0.5 gpm inflow. Upon eye-up, the eggs will be shocked to allow for the removal of dead and unfertilized eggs, then returned transferred to vertical stack incubators for incubation through hatch. All fish will be thermally marked at this stage by regulating water temperatures to apply otolith bands. Fungus in the incubators, prior to eyed stage, is controlled by formalin drip, consistent with Co-manager Fish Health Policy guidelines. In the first year of operation (brood year 1999), survival rates for JCL summer chum during incubation were 66% to eye-up. Most mortality was likely due to low viability of milt from the earliest returning males; this has also occasionally been observed with the earliest egg takes from summer chum in the Salmon Creek supplementation program. Fish will be held as long as possible to fully ripen in future years to address this potential problem. For brood year 2000, survival was 95.3% from green egg-to-eyed egg.

9.1.4) Incubation conditions.
High quality water sources at Hurd Creek Hatchery and JCL Creek facility also include settling basins and pose low or no siltation risk. Eggs are checked at eye-up and protected during the tender stage (maintained in darkness, disturbance is avoided, etc.) Temperature regimes and dissolved oxygen levels have posed no problems during operation of Hurd Creek Hatchery.

Because the well water used for incubation at Hurd Creek is warmer and less variable diurnally than ambient water temperatures in the natural incubation environment in JCL Creek, the development of the summer chum eggs at Hurd Creek Hatchery would be artificially advanced. The eggs at Hurd Creek would therefore hatch and swim-up much earlier than their wild counterparts, leading to the potential for diminished survival if the hatchery fish were released as when productivity in the marine environment would be low. To address this potential risk, eyed eggs are placed in vertical stack incubators and chilled to slow cumulation of temperature units and minimize this potential difference in advanced development. In addition, the 1 to 1.5 month rearing period required to achieve a 1.0 gram average fish size at release planned for the JCL program will act to balance this differential in development rates, so that the hatchery fish are released into the environment during the natural summer chum emigration period in March and April.

9.1.5) Ponding.
Fry from each egg take remain in incubators until nearly 100% of fry are fully buttoned up at which time forced ponding occurs. Average weight at this time is about 1,200fpp.

Brood	Eye-up		Ponding	
year	Dates	TU (F)	Dates	TU (F)
1999	10/9	450	forced,2/21	not applicable due to chilling

9.1.6) Fish health maintenance and monitoring.
All summer chum are incubated under the guidance of certified fish health personnel from WDFW and in accordance with the Co-Manager's Fish Health Policy (WDFW and WWTIT 1998). All eggs transferred from JCL Creek for fertilization at Hurd Creek Hatchery are water hardened in an iodophore solution. Fungus in incubators is controlled by formalin drip prior to the eyed stage. Eggs are shocked at eye-up to remove mortalities.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.
Eggs will be incubated using high quality water to minimize the risk of catastrophic loss due to siltation. All summer chum are incubated under the guidance of certified fish health personnel from WDFW and in accordance with the Co-Manager's Fish Health Policy (WDFW and WWTIT 1998); see 9.1.6 above.

9.2) <u>Rearing</u>:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available..
None available; rearing not completed for first brood year in program.

9.2.2) Density and loading criteria (goals and actual levels).
Hatchery rearing densities will be those that yield the highest expected survivals. The following conservative "standard" and "maximum" pond loading densities will be applied in all proposed supplementation programs to promote the release of healthy, viable fish, as reported in the SCSCI:

	Pounds fish/gpm inflow		**Pounds fish/ft3 rearing volume**	
Chum size	Standard	Max.	Standard	Max.
Swim-up	<1.0	1.5	0.5	0.75
1200-600/lb	1.0	2.5	1.0	2.0
600-400/lb	1.5	3.0	1.0	2.0

Actual loading densities at Hurd Creek Hatchery and JCL Creek are consistent with SCSCI guidelines.

9.2.3) Fish rearing conditions
Fry will be removed from incubators and ponded into circular tanks at Hurd Creek Hatchery upon absorption of the yolk sac. Temperature regimes and dissolved oxygen levels have posed no problems during routine operation of the facilities.

9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.
Biweekly weights, measuring fish per pound (fpp), are taken for pooled egg takes.

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.
Not collected, applicable, nor available. Fry are targeted for release at one gram average size to ensure that fry have sufficient energy reserves.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).
At Hurd Creek Hatchery, feed is presented to the fry six times per day until fry are feeding actively; and then at 2% to 3.5% per body weight per day until transfer to JCL Creek. At JCL Creek, feed is presented to the fry via hand casting and 12-hour automatic spring driven belt feeders. Commercial feed at the rate of 2.5% per body weight per day is used. Freshwater rearing tanks are loaded up to a maximum of 4,000 fish each and flows are maintained at approximately 5-8gpm. Hand casting of feed over the rearing tanks water surface is done at least once a day to ensure all fish have exposure to feed. At Hurd Creek and JCL, sample weights to identify fish size and appropriate feeding rates are taken every one to two weeks during the fresh water rearing period. Fish behavior and mortality is recorded daily to monitor the population for fish disease outbreaks.

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.
All summer chum are reared under the guidance of certified fish health personnel from WDFW and in accordance with the Co-Manager's Fish Health Policy (WDFW and WWTIT 1998). Fish are monitored daily during rearing for signs of disease, through observations of feeding behavior and monitoring of daily mortality trends. Preferred and maximum pond loading and feeding parameters are adhered to at all times, as specified in the SCSCI (WDFW et al. 2000); see 9.2.2..

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.
Not applicable.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.
None.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.
Hurd Creek Hatchery is staffed full-time to allow for rapid response to catastrophic events including flooding or power failure. A low flow alarm system and back-up generator also allow for appropriate response to water or power failures to safeguard rearing fish. At JCL facility , spring water is gravity fed to a water clarifying tank, remote site incubators, and rearing tanks. Water is supplied by two small, screened head boxes connected to PVC pipes and positioned up-gradient, at the source of the springs; each intake system serves as a back-up for the other in case of failure. More frequent checking of the water supply and facility will occur when periods of potential higher flows may pose additional risks. At both facilities, uniform rearing methods are applied across egg take groups. Fry are reared for about 30 to 45 days which limits risk of domestication. Fry are reared and released at JCL Creek to acclimate and imprint fry to the native watershed.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry	86,000	350-550	March - May	Jimmycomelately Creek
Fingerling				
Yearling				

10.2) Specific location(s) of proposed release(s).

Stream, river, or watercourse: Jimmycomelately Creek, WRIA 17.0285
Release point: Jimmycomelately Creek, RM 0.1
Major watershed: Sequim Bay
Basin or Region: Strait of Juan de Fuca

10.3) Actual numbers and sizes of fish released by age class through the program.

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988								
1989								
1990								
1991								
1992								
1993								
1994								
1995								
1996								
1997								
1998								
1999								
2000			3,880	1.0 g				
Average			3,880	1.0 g				

Data source: No releases; this is first year of program. (Link to appended Excel spreadsheet using this structure. Include hyperlink to main database)

10.4) Actual dates of release and description of release protocols.

2000: April 8; see 5.6 and 10.11 for release protocols followed.

10.5) Fish transportation procedures, if applicable.

The fry are bucketed from the rearing tanks into a 4' x 4' x 3' plastic tote filled with freshwater aerated with regulated oxygen via air stone for transport to lower Jimmycomelately Creek. The fish are then transferred into buckets and hand-carried for release near the creek mouth at approximately RM 0.1; transport and release takes < 60 minutes

10.6) Acclimation procedures

None

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

100% otolith-marked.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

None anticipated. Any surplus production will be handled consistent with protocols in the SCSCI.

10.9) Fish health certification procedures applied pre-release.
Examination by WDFW fish pathologist prior to release.

10.10) Emergency release procedures in response to flooding or water system failure.
If fish are developed to the fry stage and ponded, they can be netted into buckets and carried 30 yards to JCL Creek for direct release.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.
The fry are released in the evening, on or near a high tide, to minimize the incidence of avian and fish predation. Fed fry are released that will maximize survival.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

It is planned that all "Performance Indicators" identified in Section 1.10 will be monitored and evaluated.

To date, the following "Performance Indicators" **addressing benefits** have been monitored for the Jimmycomelately Creek summer chum supplementation program:

Element 1: Estimate the contribution of supplementation/reintroduction program-origin chum to the natural population during the recovery process.

1. Differentially mark all hatchery-origin summer chum fry to allow for distinction from natural-origin fish upon return as adults on the spawning grounds. This will be accomplished by otolith (thermal) marking or another permanent, effective method.
2. Conduct spawning ground surveys throughout the summer chum return to enumerate spawners, and to collect information regarding fish origin (via random sampling of fish heads for otoliths), and age class composition through scale sampling.

To date, the following "Performance Indicators" **addressing risks** have monitored for the Jimmycomelately Creek summer chum supplementation program:

Element 2: Monitor and evaluate any changes in the genetic, phenotypic, or ecological characteristics of the populations presently affected by the supplementation program.

1. Collect additional GSI data (allozyme or DNA-based) from regional summer chum adult populations to determine the degree to which discrete populations exist in the individual watersheds.

2. Continue GSI allozyme collections of summer chum spawners throughout the region for comparison with past collections to monitor changes in allelic characteristics, and with the intent to assess whether the supplementation program has negatively affected the genetic diversity of natural populations.

4. Continue collecting and archiving DNA samples for future analysis.

Element 3: Determine the need, and methods, for improvement of supplementation or reintroduction operations or, if warranted, the need to discontinue the program.

1. Determine the pre-spawning and green egg to released fry survivals for each program at various life stages.

e. Monitor growth and feed conversion for summer chum fry.

f. Determine green egg to eyed egg, eyed egg to swim-up fry, and swim-up fry to released fry survival rates for summer chum.

g. Maintain and compile records of cultural techniques used for each life stage, such as: collection and handling procedures, and trap holding durations, for chum broodstock; fish and egg condition at time of spawning; fertilization procedures, incubation methods/densities, temperature unit records by developmental stage, shocking methods, and fungus treatment methods for eggs; ponding methods, start feeding methods, rearing/pond loading densities, feeding schedules and rates for juveniles; and release methods for fed fry.

h. Identify where the supplementation program is falling short of objectives, and make recommendations for improved fry production as needed.

2. Determine if broodstock procurement methods are collecting the required number of adults that represent the demographics of the donor population with minimal injuries and stress to the fish.

a. Monitor operation of adult trapping operations, ensuring compliance with established broodstock collection protocols for each station.

b. Monitor timing, duration, composition, and magnitude of each run at each adult collection site.

c. Maintain daily records of trap operation and maintenance, number and condition of fish trapped

d. Collect biological information on collection-related mortalities. Determine causes of mortality, and use carcasses for stock profile sampling, if possible.

e. Provide recommendations on means to improve broodstock collection, and refine protocols if needed for application in subsequent seasons.

3. Monitor fish health, specifically as related to cultural practices that can be adapted to prevent fish health problems. Professional fish health specialists supplied by WDFW (or USFWS for federal agency operations) will monitor fish health.

a. Fish health monitoring will be conducted by a fish health specialist. Significant

fish mortality to unknown causes will be sampled for histopathological study.

b. The incidence of viral pathogens in summer chum broodstock will be determined by sampling fish at spawning in accordance with procedures set forth in the "Co-Managers of Washington Fish Health Policy (WDFW and WWTIT 1998).

c. Recommendations on fish cultural practices will be provided on a monthly basis, based upon the fish health condition of chum fry.

Element 4: Collect and evaluate information on adult returns.

This element will be addressed through consideration of the results of previous "Elements 1., 2., and 3.", and through the collection of information required under adaptive criteria that will be used as the basis for determining when to stop a supplementation or reintroduction program.

1. Collect age, sex, length, average egg size, and fecundity data from a representative sample of broodstock used in supplementation program for use as baseline data to document any phenotypic changes in the populations.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Funding, staffing, and support are available and committed for current Monitoring and Evaluation for brood year 1999. It is anticipated that WDFW will provide some funding, but that some federal funding will be needed in future years; it is being sought.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

It is anticipated that adherence to monitoring and evaluation protocols in the SCSCI will not elevate risk to listed summer chum. Listed chinook salmon are not present in the Jimmycomelately Creek watershed and will not likely be affected by the program.

SECTION 12. RESEARCH

Provide the following information for any research programs conducted in ***direct association with the hatchery program described in this HGMP. Provide sufficient detail to allow for the independent assessment of the effects of the research program on listed fish****. If applicable, correlate with research indicated as needed in any ESU hatchery plan approved by the co-managers and NMFS. Attach a copy of any formal research proposal addressing activities covered in this section. Include estimated take levels for the research program with take levels provided for the associated hatchery program in* ***Table 1****.*

Not applicable to this program. Research currently underway or planned for similar summer chum supplementation projects at Big Beef Creek and Quilcene National Fish Hatchery will provide valuable information regarding the effects and success of chum supplementation programs and be applicable here.

12.1) Objective or purpose.
Not applicable

12.2) Cooperating and funding agencies.
Not applicable

12.3) Principle investigator or project supervisor and staff.
Not applicable

12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.
Not applicable

12.5) Techniques: include capture methods, drugs, samples collected, tags applied.
Not applicable

12.6) Dates or time period in which research activity occurs.
Not applicable

12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.
Not applicable

12.8) Expected type and effects of take and potential for injury or mortality.
Not applicable

12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1). Not applicable

12.10) Alternative methods to achieve project objectives.
Not applicable

12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.
Not applicable

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.
Not applicable

SECTION 13. ATTACHMENTS AND CITATIONS

Include all references cited in the HGMP. In particular, indicate hatchery databases used to provide data for each section. Include electronic links to the hatchery databases used (if feasible), or to the staff person responsible for maintaining the hatchery database referenced (indicate email address). Attach or cite (where commonly available) relevant reports that describe the hatchery operation and impacts on the listed species or its critical habitat. Include any EISs, EAs, Biological Assessments, benefit/risk assessments, or other analysis or plans that provide pertinent background information to facilitate evaluation of the HGMP.

Allendorf, F.W., D. Bayles, D.L. Bottom, K.P. Currens, C.A. Frissell, D. Hankin, J.A. Lichatowich, W. Nehlsen, P.C. Troter, and T.H. Williams. 1997. Prioritizing Pacific salmon stocks for conservation. Conservation Biology Vol. 11 No. 1 p. 140-152.

Washington Department of Fisheries, Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. 1992 Washington State Salmon and Steelhead Stock Inventory. Olympia. 212 p.

Washington Department of Fish and Wildlife. 1996. Fish health manual. Hatcheries Program, Fish Health Division, Washington Dept. of Fish and Wildlife, Olympia. 69 p.

Washington Department of Fish and Wildlife and Western Washington Treaty Indian Tribes. 1998. Co-managers of Washington fish health policy. Fish Health Division, Hatcheries Program. Washington Dept. of Fish and Wildlife, Olympia.

Washington Department of Fish and Wildlife and Point-No-Point Treaty Tribes. 2000. Summer Chum Salmon Conservation Initiative. Hood Canal and Strait of Juan de Fuca Region. Jim Ames, Chris Weller, Gary Graves, editors. Fish Program, Washington Department of Fish and Wildlife, Olympia.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Thom H. Johnson, WDFW, District Fish Biologist

Certified by_____ Date: February 28, 2000

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Summer chum salmon ESU/Population: Hood Canal Summer Chum ESU / Jimmycomelately Creek Activity: Supplementation				
Location of hatchery: Hurd Creek Hatchery / Jimmycomelately Creek Dates of activity: August - May Hatchery program operator: WDFW, North Olympic Salmon Coalition, Wild Olympic Salmon				
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)			33	300
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)			97	
Intentional lethal take f)				
Unintentional lethal take g)			2	
Other Take (specify) h)				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release.
e. Listed fish removed from the wild and collected for use as broodstock.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.